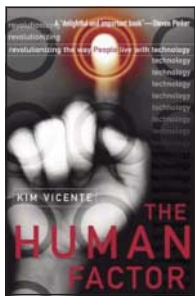


# reviews

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## The Human Factor: Revolutionizing the Way People Live with Technology

Kim Vicente



Routledge, \$27.95, pp 352  
ISBN 0 415 97064 4  
[www.routledge-ny.com](http://www.routledge-ny.com)

Rating: ★★★★★

What do the Chernobyl nuclear disaster and the painting of flies on men's urinals have in common? According to Kim Vicente, both are examples of the way in which technology and people interact to create more or less desirable outcomes.

In the case of Chernobyl, the designers of the nuclear power plant developed a technology that outstripped the ability of the operators to use it safely. The tragic consequence was an explosion that resulted in death or serious illness to thousands of people, with reverberations around the world.

By contrast, the strategic location of painted flies on men's urinals minimised the risk of "splash back" by making it easy for the users to do what comes naturally. In this case, the technology in question (the painted flies) appealed to the desire of men to aim in a direction that avoided an adverse outcome (trouser stains).

Both examples illustrate the need for technology to be designed in a way that

takes account of human capability and fallibility. Nowhere is this need greater than in health care. Ever since the Harvard medical practice study (*New England Journal of Medicine* 1991;324:370-6, 377-84) estimated that there were between 44 000 and 98 000 preventable deaths each year in US hospitals, the issue of patient safety has risen up the health policy agenda.

In the process, there has been increasing recognition that most medical errors are not the result of individual failings. Rather, healthcare professionals make mistakes because humans are fallible, and because they use technologies that sometimes increase the risk of error. The argument of this book is that these mistakes will only be avoided through systems thinking.

Vicente shows how aviation has developed systems that have resulted in demonstrable improvements in safety for air travellers. These systems include reporting arrangements that promote learning from near misses, and training programmes that enable aircraft crews to work effectively as teams. The design of cockpit instruments has also improved with simple changes in layout and materials helping to reduce errors and promote safety.

Belatedly, some of the lessons from aviation are being applied in health care, although there is a way to go before the same levels of safety are achieved. The obstacles to health care becoming as safe as air travel include the fear of legal liability if mistakes are reported more openly, and a culture in which doctors are trained to believe themselves to be infallible. These obstacles are being overcome through a combination of government action, initiatives from within the health professions, and pressure for reform from an increasingly critical and demanding public.

Vicente argues that further progress depends on bringing together the human sciences and the technical sciences. In essence, he proposes nothing less than a human-tech revolution, a new world view on a par with the Copernican revolution in astronomy, the Darwinian revolution in biology, and the Einsteinian revolution in physics. If this does not happen, then the prospect is of more nuclear power plant meltdowns, more environmental disasters, and more medical errors.

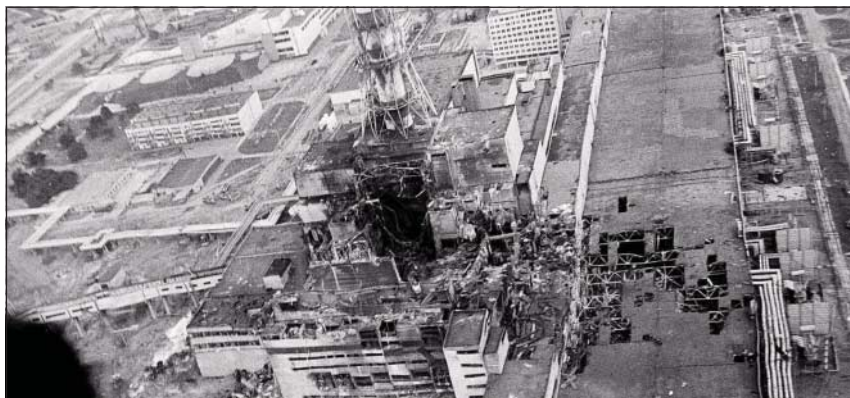
At the heart of the human-tech revolution is the need to tailor technology to human nature. Put simply, it means taking control of technology away from the so-called "wizards," who are technical experts but who may be blind to the way in which people use technology. Issues of technology design need to be considered alongside psychological limitations, team dynamics, and organisational cultures if the full potential of technology is to be realised.

Many of these arguments have been rehearsed in the field of health care by Lucian Leape, Don Berwick, and others. They are also finding favour in the health policy community, for example through the work of the Institute of Medicine in the United States and the recent focus on patient safety in the NHS. The power of *The Human Factor* is therefore less in its originality than in its accessibility and its ability to transcend sectors like aviation and health care to distil the principles that must inform future activity.

These principles include behaviour shaping constraints such as anaesthesia machines that make it physically impossible to connect a gas hose to the wrong nozzle; shape coding that makes it easy for people to distinguish between controls that do different things; incident reporting systems that encourage organisational learning; and training systems that promote team working and safety improvements.

The principles outlined in this book are intended to harness technology to better serve human purposes, rather than requiring people to become super human users of complex technology. Anyone who has struggled to master a mobile phone, VCR player, or everyday software package can only endorse this plea. It is to be hoped that those designing the new information technology system for the NHS will also heed the important messages of this book.

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Chernobyl: lessons for patient safety



## Dispatches. MMR: What They Didn't Tell You

Channel 4, Thursday 18 November at 9 pm

Rating: ★★★★★

If you didn't see this programme, find someone who taped it. Not only will you learn something about the MMR (measles, mumps, rubella) health scare, but it will also give you the opportunity to watch one of the most exciting examples of investigative television journalism you will ever see. This episode of *Dispatches* was utterly compelling both in its presentation and in its lack of emotional blackmail.

Presenter and journalist Brian Deer seems to have singlehandedly eaten away at the MMR story. His clear and simple presentation of this, his latest chapter—describing an enormous clash and conflict of interest between science, business, huge egos, and the potential to make megabucks—belies the huge and prolonged efforts he has clearly gone to in trying to get to the bottom of the MMR tale of woe.

The story so far: following the publication of his paper in the *Lancet* (*Lancet* 1998;351:637), Dr Andrew Wakefield held a press conference in February 1998, during which he raised concerns that the MMR vaccine might be causally linked to inflammatory bowel disease and the subsequent development of autism in young children. These concerns in turn led Dr Wakefield to offer his own personal opinion that giving single measles, mumps, and rubella shots might be safer for children. In one fell swoop he had undermined the MMR vaccination programme in the United Kingdom, and subsequently around the world.

As scientists and epidemiologists watched the unravelling of the MMR vaccination campaign, some questions cried out for an answer. Where was Andrew Wakefield coming from? What was the basis of his opinion that single shots might be safer? Large scale international epidemiological studies have repeatedly failed to find any indication for his advice to give single shots, or confirm the assertion of a causal link between the MMR vaccine and autism. While much time and money have been spent trying to find the answers in scientific study, Deer's documentary suggested that the answers might be found in the world of commerce.

*Dispatches* alleged that, nine months before the 1998 press conference, Dr Wakefield had filed patent applications at the London Patent Office for a new, alternative single measles vaccine and several potential treatments and even "cures" for inflammatory bowel disease and autism.

Nine months later, the MMR health scare was sparked by parties to those patent applications. As one commentator who was put on the spot by Deer said, on being made aware of this, not only did these patented "inventions" represent enormous claims, they also represented the potential of big money. Enough, it was agreed, to open a new medical school.

Deer dug further to find out exactly what had been patented. Members of the scientific community to whom he showed the applications unanimously agreed that the proposed technology behind the inventions (for example, injecting measles into mice, and then, after extracting and processing white cells, injecting the result into pregnant goats and using their colostrum to create capsules for children) lacked scientific credibility.

Cut to an interview with a hitherto unknown character called Dr Nick Chadwick, a scientist who was a PhD student in Wakefield's team in the late 1990s. Dr Chadwick was responsible for devising the scientific techniques that would later be used to detect the presence of the measles virus in the guts of children with autism. Dr Chadwick told Deer categorically that using these techniques he had not detected any live measles virus in the guts of any of the 40 children examined. Nor was any measles virus found in any of the cerebrospinal fluid samples obtained. And yet, despite this, these findings were not made public. Dr Wakefield claims that he subsequently published the fact that he considered the technology used by Dr Chadwick to be insufficiently sensitive.

When Deer asked Dr Chadwick why he had not divulged his findings at the time, his excuse was that he thought the story would simply die. At the time he was a student, and he felt he could not argue with Dr Wakefield, who was a charismatic supervisor.

Dr Wakefield now spends much of his time in the United States, where he is linked to a company that promotes products said to be of benefit to autistic children. He continues to address huge audiences at major conferences on autism. And he continues to refuse to be interviewed by Brian Deer.

He has also issued a statement on the internet stating that many of the claims made by Deer were "demonstrably false" and that because there had been "no objectivity in the manner of their intended portrayal, I declined to participate in any way in the making of the . . . programme" ([www.whale.to/a/wak333.html](http://www.whale.to/a/wak333.html)).

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*Items reviewed are rated on a 4 star scale (4=excellent)*

### NETLINES

- The web is a wonderful repository of image collections, and a lovely example is the Trauma Imagebank ([www.trauma.org/imagebank/imagebank.html](http://www.trauma.org/imagebank/imagebank.html)). It is a well designed page with basic text filling most of the screen, but to the left are the images, in folders according to main subject headings. Click on a folder and the images appear on the right hand side of the screen. Some are clinical pictures, though radiology is well represented.

- A simple introductory screen leads to an excellent range of clinical practice guidelines at a site from the Royal Children's Hospital in Australia ([www.rch.org.au/clinicalguide/cpg.cfm](http://www.rch.org.au/clinicalguide/cpg.cfm)). It covers a wide range of paediatric problems likely to face a junior doctor, though the guidelines could also be a revision resource for more senior doctors. The site has some good illustrations and a wide range of subjects. Even better, it has an in-house search engine, and you can view all the contents by clicking on "All."

- When patients ask for more information about a clinical trial they are participating in, they may be overloaded with information or simply may not be able to understand it. One source of well written material is part of the substantial website of the UK based National Electronic Library for Health ([www.nelh.nhs.uk/clinicaltrials/default.asp](http://www.nelh.nhs.uk/clinicaltrials/default.asp)). This part of the website is aimed at patients—it is written in clear and understandable language and is broken into easily digestible subsections. It contains a glossary, and a version can be downloaded as a Word file.

- The management of postoperative pain can be a difficult issue, so there may be some help at the site of the Procedure Specific Postoperative Pain Management (Prospect) project ([www.postoppain.org](http://www.postoppain.org)). The site currently features three common postoperative scenarios: laparoscopic cholecystectomy, total hip arthroplasty, and abdominal hysterectomy. Various sources of knowledge are brought together to provide practical support for health professionals managing such patients.

- Doctors are always on the lookout for good collections of guidelines, and one from Ontario is worthy of consideration (<http://gacguidelines.ca/index.pl>). Input from the local ministry of health and a medical association makes for an evidence based framework. The guidelines themselves cover a wide range of common everyday topics, including angina, back pain, chronic obstructive pulmonary disease, and preterm births. They are accessible through a simple scrolling index window, and a click takes you directly to the guideline.

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We welcome suggestions for websites to be included in future Netlines. Readers should contact Harry Brown at the above email address.





## Fix for low sex drive puts reporters in a bad patch

*Stories about the testosterone patch are a case study in misleading media coverage*

As the debate over the safety of new anti-arthritis drugs rolls around the world, the gap between marketing messages and scientific truths becomes clearer by the day. The estimated toll of heart attacks associated with Merck's rofecoxib (Vioxx) mounts; questions about other COX 2 inhibitors arise; and the drug companies and regulators are rightly being criticised and investigated. Now is a good time for rigorous scrutiny of the media's role in initially boosting this new class of anti-arthritis drugs: the record will show that many reporters seemed simply to reproduce the marketing hype in their stories.

Yet even while this debacle continues, another case study in misleading media coverage around the world is fast emerging: many of the articles about the experimental testosterone patch for women look more like marketing fiction than rigorous journalism. In their search for sexy stories some media outlets are exaggerating the benefits of the patch, inflating the potential pool of

patients, playing down well established harms, and ignoring important conflicts of interest. None of the key clinical trials of Procter & Gamble's testosterone patch has been published in peer reviewed journals, yet for a year or more excited media reports have sung the praises of the latest panacea for women's "low sex drive." Next week, despite a virtual worldwide absence of independent public scrutiny of the scientific data, a panel of advisers to the US Food and Drug Administration will decide whether or not to recommend this drug's approval.

In May the BBC ran a story with the headline "Patch 'boosts women's sex drive,'" which can still be found on its website. The second line says a trial among women who had had hysterectomies found that the patch caused a "74 per cent increase in satisfying sex." A professor at George Washington University describes a "tremendous medical need" to help women with low sexual desire, and a University of Central Lancashire professor declares the patch "exciting news." The BBC story made no mention of side effects or conflicts of interest.

That BBC story was based on marketing material sent out two days earlier by Procter & Gamble and its Manhattan based media advisers Hill & Knowlton—one of the world's most prolific public relations firms—and it was timed to coincide with a conference presentation in Philadelphia. Hill & Knowlton helped distribute a video news release and a press release, featuring as its first line the testosterone patch's miraculous ability to produce a "74 per cent increase" in sex.

At this stage we don't know exactly what that "74 per cent increase" actually means, because the complete data of the trial

remain unpublished, and it is unclear what was being measured. What we do know, however, is that this figure describes the relative increase in the amount of "satisfying sexual activity" for women rather than the absolute increase. In absolute terms the benefits of the drug look much less impressive. Several abstracts seem to show that wearing the testosterone patch for six months increases satisfying sexual activity for women by just one "episode" or less a month, compared with a placebo.

Along with exaggerating the benefits of drugs, it is not uncommon for the media to inflate the estimated numbers of people affected by medical conditions. Although Procter & Gamble is currently seeking approval to market the testosterone patch for only a limited number of post-menopausal women who have had their ovaries removed, some media stories are already endorsing the drug for a much larger population. An article in the Chicago *Sun-Times* in September, "Not in the mood? Now there's a patch," claimed that the drug was designed to treat the widespread problem of "low libido" allegedly experienced by "30 per cent of women." Like the BBC the *Sun-Times* made no mention of trial data indicating that the patch added, on average, just one, or less, satisfying sexual episode a month, for surgically menopausal women. The article did, however, list some of the potential side effects of testosterone: "weight gain, clitoral enlargement, increased facial hair, and high cholesterol."

One of the poorest examples comes from the *New Scientist*, a media outlet describing itself as "The world's no. 1 science and technology news service." This story, which was based on a conference presentation in Texas last year, did not give any absolute figures, did not mention any harms, and did not show that the main expert quoted was flown in from Australia by Procter & Gamble. As it turns out, the key trials of the patch have all been funded by the company, several key "thought leaders" in the field, including some trial investigators, have financial ties to the company, at least one of the investigators is a company employee, and the measurement scales used in the trials were also funded and designed with input from Procter & Gamble.

Given the strong evidence that studies funded by drug companies tend to find more favourable results than independent studies, together with the increasingly common scandals over drug safety and conflicts of interest and the fact that key data on the patch have not yet been peer reviewed and published, the excited media stories tell us much more about standards of journalism rather than the latest remedy for a lack of interest in sex.

Procter & Gamble declined requests for interview.

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# PERSONAL VIEW

## Grand rounds

It's the Friday lunchtime grand round, and I am presenting. The cardiologist stands up to introduce me: "Today we are going to tell you about a very interesting and unusual case, and I want you to shout out the diagnosis when you've got it. It's about a 46 year old man who first presented to us..." Someone shouts out from the floor: "Atrial myxoma." Game over. Or was it?

Grand rounds have changed a lot in recent years. They used to be about patients with rare diseases who presented in an unusual way (a man with Whipple's disease who had a pyrexia of unknown origin). Progress brought us patients with rare diseases who had typical symptoms (a 30 year old woman with uncontrolled hypertension who had a phaeochromocytoma) and then patients with common diseases who presented in an unusual way (a 40 year old man with coeliac disease who had a myopathy).

And what's their future?

Increasingly we will hear about patients with common diseases who have typical symptoms. Why shouldn't we? These are the patients we see every day in casualty departments. Good presenters will find out what the audience's learning needs are and will choose stories to fulfil those needs. For example, generalists are tired of hearing the same old lectures on cardiac failure. What they want to learn about is recent advances—such as the role of B-type natriuretic peptide in diagnosis, how to prescribe  $\beta$  blockers, and when to prescribe spironolactone. They will also want to know when to start concentrating on palliative care.

Another way of finding out what the audience needs to learn about is to ask specialists what common errors in treatment are made by non-specialists. You can then choose stories to demonstrate these errors and, most importantly, how to avoid them. For example, a common error in the treatment of heart failure is to stop the angiotensin converting enzyme inhibitor the minute the patient starts coughing. But of course cough is a common symptom of pulmonary oedema or coexistent bronchitis, so you should also consider these causes.

The first rule of thumb for presentations is to know your audience and aim your presentation at them. But how do you engage an audience that is made up of medical students, junior doctors, and gastroenterologists (and chemical pathologists who always turn up and always sit at the front)? Everybody likes to hear about generic topics such as confidentiality or communication skills. You can promote good communication skills at grand rounds, but some of the audience will switch off. Mentioning the science of communication skills sometimes

helps to engage them. Here is a good statistic to start off with: on average doctors will perform 200 000 consultations during their working life, so it is fairly important that they work on their skills.

And why don't we ask patients what they want their doctor to learn about? Cardiologists teaching about cardiac failure will talk about shortness of breath and peripheral oedema, but many patients will talk about fatigue, anxiety, and depression. These problems can affect their quality of life just as much as their shortness of breath, and you can treat these complications effectively—even if you are not a cardiologist.

In the first grand rounds specialists used to bring their patients along to the lecture theatre and demonstrate the symptoms and signs before everyone. With increasing use of video, grand rounds will return to their beginnings. It can be intimidating for a lay person to tell a large audience about their problems, but some patients and relatives don't mind telling their story face to face.

And how will we evaluate the effectiveness of these new, improved grand rounds? You could hand around evaluation forms, but many people are too polite to tell you what they really thought. It's better to hand around a mini-test at the start to establish everyone's baseline knowledge of the subject. In the test try to think of questions that will test the audience's application of knowledge and decision making ability rather than just their ability to remember dry facts. You can then ask them to fill it out again at the end to see what they have learnt. Hand it around again a few months later to see whether they have retained anything. And, most importantly, ask them whether they have put what they learnt into practice. The pre-test and post-test will, I hope, show that your presentation filled important gaps in their knowledge. The annual winner of the best presentation will then become the winner of the most effective presentation.

But the first thing we need to do is change the name. Grand rounds are only for those with delusions of grandeur. And for those people who will still only go to them because they like detective stories, here is the grand finale: without any trumpet blowing introductions I showed the histology result a few Friday lunchtimes later. The heckler with the mind reading powers was nearly right: it was an atrial tumour—but a haemangioma. How did he know that a cardiologist would present a cardiology rarity? I would have asked my sheepish boss, but he was busy.

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# SOUNDINGS

## Remedial nursing

What do nurses actually do? There can be few doctors who have never wondered; and surely far fewer who have ever dared ask. Perhaps like most of us, I have pondered the question off and on over the years: ever since a student nurse on night duty when I was a houseman brought it to my notice that the man was dying and the least we could do was make him comfortable.

I have been wondering again recently, and especially over the last few years, when patients in the ever more hard-pressed acute wards I simply visit have been transferred for post-acute rehabilitation in wards where they are in my care.

But in truth they're not. They are of course in the care of the nurses who are there in numbers, there all the time, and—in these particular post-acute wards—there to make a remarkable difference. Again and again, the bewildered, bedraggled survivors of an acute episode, whom previously I have seen only lying in bed, or sitting in night clothes by their beds, often hungry and thirsty and lacking the ordinary dignities of tidiness and regular human contact, are given back their humanity by the magic of nursing. Sometimes—and to my embarrassment after having seen them twice a week for up to a month—they are so transformed that I fail to recognise them.

Strange, magical things have happened. Proud women have been reunited with their clothes and lipstick. Scruffy men have been shaved and even rejuvenated by smart, informal haircuts. And everyone is better fed, not just because the food is better but because there is enough time and skill to feed all those who cannot feed themselves.

Basic nursing care—whatever that is—is taken for granted and it helps, in a remarkable proportion of cases, to turn even the frailest patients back into people, and to get them home.

And the nurses in the acute wards, what do they actually do? Like nurses almost everywhere they do their best, but for them it is more difficult. The dispiriting overstretch and the relentless here-today-gone-tomorrow, lots-more-patients-need-the-beds imperative largely disable them. They too would like to get to know their patients properly and care for them better. They just can't. But for those they worry about most, and somewhere down the line, remedial nursing is there, and can still help.

**Colin Douglas** doctor and novelist, *Edinburgh*